

The Importance of Animation in Guided Inquiry of Human Excretory System Material

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Abstract: 21st century learning demands various skills that must be mastered by students, so education can prepare students to master these skills in order to become successful individuals in their lives. In order for students to have these skills, the teacher must be able to practice using the right strategy in the learning process. One of them is using guided inquiry learning model, because this learning model can have a positive influence on students and the learning process will be more effective and efficient. The skills developed in the guided inquiry learning model can be more interesting and meaningful, if it is performed through the right media. One of the media that can attract attention during the learning process is animation. This preliminary study was conducted on 150 public and private junior high school students in 6 regencies or cities in Lampung Province, Indonesia. This study used descriptive qualitative method and the data was collected by using a questionnaire. The results of the study showed that science learning with guided inquiry learning model was not implemented properly, especially in the following variables, namely the formulation of problems, make hypotheses and prove hypotheses. The animation in the learning process was still rarely used. Therefore the use of animation in learning process is very necessary because it can have a positive impact on the understanding of students on something abstract.

Keywords: 21st century learning, Guided inquiry, Animation

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I. Introduction

21st-century learning is defined as learning that has the power of globalization, widespread technology, and demands for innovation in the learning environment to form a dynamic and challenging environment for education¹. 21st-century learning demands various skills that must be mastered by students, so education can prepare students to master these skills in order to become successful individuals in their lives^{2,3,4}. Several skills that must be mastered by the students in facing life in the 21st century namely, critical thinking and problem-solving skills, collaboration and leadership, agility and adaptability, initiative and entrepreneurial spirit, able to communicate effectively both verbally and in writing, able to access and analyze information, and have curiosity and imagination⁵.

These skills can be possessed by students if the teacher trains and uses appropriate strategies in the learning process⁶. One of the strategies is to use guided inquiry learning model because this learning model has a positive influence on students and the learning process will be more effective and efficient⁷. The guided inquiry also equips students with the skills and competencies to meet the challenges of an uncertain and changing world⁸.

Guided inquiry is a student-centered learning model where students interact actively, assume and provide a point of view on every material learned by students. In the guided inquiry learning model, the teacher only provides resources and problems to be examined, then students plan their own practice to solve the problem⁷. The teacher facilitates and encourages students to investigate and construct their own meaning from events and phenomena that occur naturally. Through this investigation, the level of skills and abilities of students can be honed well in the learning process. The guided inquiry also emphasizes higher-order thinking skills namely gathering, analyzing, and synthesizing information and data from various sources and points of view⁹.

The skills developed in the guided inquiry learning model can be more interesting and meaningful if it is performed with the right media. One of the media that can attract attention in the learning process is animation. The animation is an audiovisual media that is presented in the form of images and sounds¹⁰. Animation is a tool that makes students more interested in the learning process because the presentation of learning materials motivates students. Animation can be used to direct student attention to important aspects of

the material being studied, it can also be used to teach procedural knowledge and support student learning in conducting cognitive processes¹¹.

Animation can be used as an alternative medium in the learning process that is difficult to explain directly. This media can help students to be more focused and more receptive to the material in accordance with the learning objectives. The use of animation in the learning process has a positive impact on abstract understanding. Many countries utilize animation in the learning process because this is an innovative, constructive and student-centered alternative. The animation is Animation can also save time, energy and money because in learning a certain material, the teacher does not need to present objects concretely¹³.

Based on the explanation above, a study is needed to determine the importance of animation in the learning process of students of junior high schools. The purpose of this study was to describe the importance of animation in the guided inquiry of the human excretion system on students of junior high schools. The results of the study can be used as a guide in choosing a model or strategy that is appropriate in the application of science learning at the junior high school level.

II. Method

The study was conducted to determine the importance of animation in the guided inquiry learning model of human excretory system material in Lampung Province. This study was conducted from February to March 2019 with a sample of 150 9th-grade students of junior high schools in six regencies in Lampung Province, including Bandar Lampung City, South Lampung, East Lampung, Central Lampung, Pesawaran and West Coast. This study used a qualitative descriptive method. Data was collected through the distribution of questionnaires of student needs from 150 students.

The questionnaire contained statements about the use of the guided inquiry learning model and the use of animation in the learning process so far. The type of statement on the questionnaire, namely (1) Learning is oriented to the problems that occur in everyday life, (2) Learning provides an opportunity to express the formulation of the problem simply, (3) Learning provides the opportunity to propose hypotheses on the formulation of problems, (4) Learning provides an opportunity to prove the hypotheses proposed, (5) Learning provides opportunities for students to formulate conclusions from a given problem, (6) Learning process with learning media, (7) Learning media used is in the form of animation, (8) The need to use animation in learning processes.

The results obtained were then analyzed using the analysis criteria of the importance of animation in guided inquiry learning model¹⁴ which can be seen in Table 1.

Table 1. Questionnaire criteria on guided inquiry learning model and the importance of animation

Percentage	Criteria
$0 < \chi \leq 20$	Very low
$20 < \chi \leq 40$	Low
$40 < \chi \leq 60$	Fair
$60 < \chi \leq 80$	High
$80 < \chi \leq 100$	Very High

III. Results

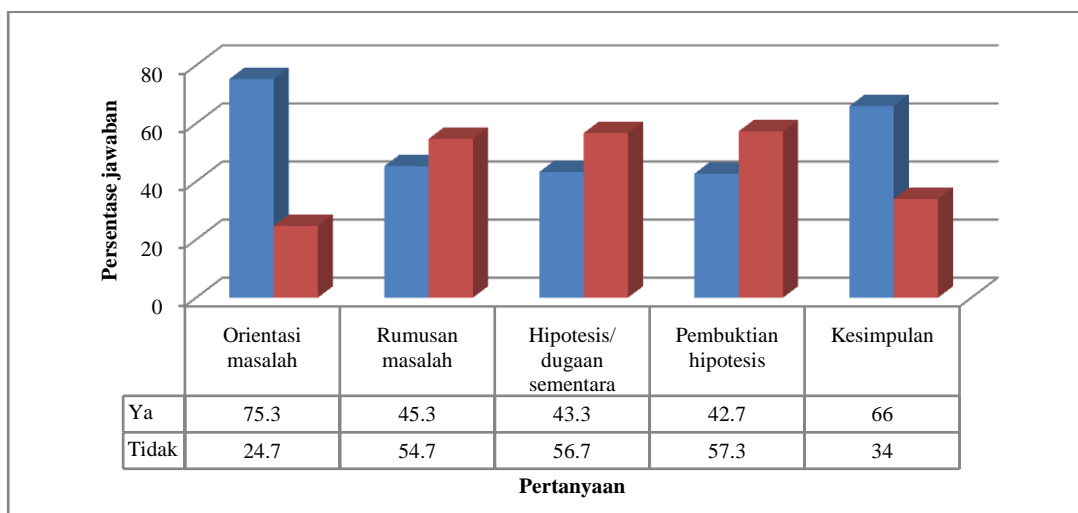
The detailed results of the study on the importance of animation in the guided inquiry learning model of the human excretory system material on students of junior high schools in Lampung Province can be seen in Table 2.

Table 2. Results of questionnaire on the importance of animation in the guided inquiry learning model of the human excretory system material

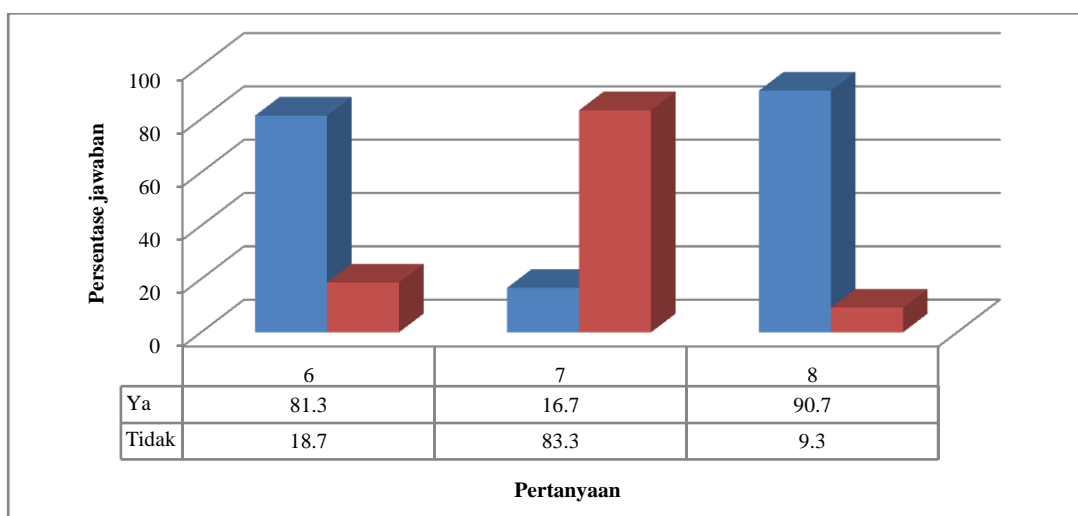
No.	Statement	Answer	
		Yes	No
1.	Learning is oriented to the problems that occur in everyday life	113 75.3%	37 24.7%
2.	Learning provides an opportunity to express the formulation of the problem simply	68 45.3%	82 54.7%
3.	Learning provides the opportunity to make hypotheses on the formulation of problems	65 43.3%	85 56.7%
4.	Learning provides an opportunity to prove the hypotheses proposed	64 42.7%	86 57.3%
5.	Learning provides opportunities for students to formulate conclusions from a given problem	99 66%	51 34%
6.	Learning process with learning media	122 81.3%	28 18.7%
7.	Learning media used is in the form of animation	25 16.7%	125 83.3%

8.	Do you agree to use the guided inquiry learning model on Human Excretory System material with animation	136 90.7%	14 9.3%
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Table 2 is divided into 2 parts, namely the use of the guided inquiry learning model to learn human excretory system in schools can be seen in questions number 1 to 5 and the need for animation in learning processes of human excretory system can be seen in questions numbers 6 to 8. The percentage of guided inquiry learning model analysis on learning can be seen in Figure 1. While the percentage of the need for animation in the learning process can be seen in Figure 2.



Graph 1. The percentage of guided inquiry learning model analysis on human excretory system learning



Graph 2. The need for animation in learning processes of human excretory system

IV. Discussion

One of the basic competencies of knowledge in science materials in 8th grade in the 2013 curriculum is to analyze the human excretory system and understand the failure in the excretory system as well as efforts to maintain the health of the excretory system¹⁵. Based on the basic competencies, in the learning process, students are required to have high-level skills because students are faced with problems that must be resolved through inquiry activities. One model that applies inquiry is guided inquiry learning model because, in this learning model, students interact actively, question assumptions and provide perspective on each material being studied⁹. The guided inquiry learning model promotes classroom practice that helps students to improve, sharpen, and follow their own questions, and develop inquiry habits in students¹⁶. Through the learning process with guided inquiry learning models, students can learn actively to present problems, propose hypotheses, conduct experiments to obtain information or data, collect and analyze data, and draw conclusions¹⁷.

Figure 1 relates to the syntax of the guided inquiry learning model on human excretory system material from 150 students as respondents, the percentage of learning that is oriented to the problems that occur in

everyday life was in the high category (75%), learning that provides an opportunity to express the formulation of the problem simply was in fair category (45.3%), learning that provides the opportunity to make hypotheses on the formulation of the problem was in fair category (43.3%), learning that provides an opportunity to prove the hypotheses proposed was in the fair category (42.7%), and learning that provided opportunities for students to formulate conclusions from a given problem was in the high category (66%).

Each learning model in the 2013 curriculum, both Discovery Learning (DL), Problem Based Learning (PBL) and Project-Based Learning (PJBL) have a syntax that is almost similar to the syntax in the guided inquiry learning model. However, the guided inquiry syntax from the needs analysis questionnaire showed that not all of them were implemented optimally in the learning process of human excretory system material. Learning syntax that is oriented to problems that occur in everyday life and formulates the conclusions of a problem given in learning were in the high category. The high syntax between these two was because teachers in every learning design and learning process always do both of these at the beginning and end of the learning process. However, three other syntaxes, namely problem formulation, make hypotheses and prove hypotheses were not performed because they were in fair and low categories. The low level of the three syntaxes was because these three syntaxes emphasized the students to do scientific work independently¹⁸ and the teacher had not accustomed students to formulate problems, make hypotheses and prove hypotheses. The teacher did not apply these three syntaxes due to a lack of understanding of the guided inquiry learning model and the number of students in one class that was too large¹⁹.

Based on Figure 2, on the analysis of the importance of animation in learning showed that the learning process with learning media was in the high category (81.3%), learning media used is in the form of animation was in a low category (16.7%) and students which stated the need for animation in guided inquiry learning models was in high category (90.7%). In the learning process, the teacher used learning media, but the animation was still rarely used. Learning media commonly used by teachers when learning processes are in the form of drawing media, charts, three-dimensional models and PowerPoint. The media used cannot explain abstract stages or processes²⁰. The animation is actually one of the technologies that are often used in the learning process. The use of animation in the learning process has a positive impact on the understanding of students on something abstract.

Animation makes it possible to prevent students from misunderstanding and to guide students to new knowledge¹². Animation can improve learning processes and reduce the cognitive burden on student memory so that it allows students to search, recognize and get more information^{21, 22}. Animation can also be used to direct student attention to important aspects of the material being learned, can be used to teach procedural knowledge, and to support student learning in cognitive processes. Students who have low initial knowledge really need animation because these students are not able to do internal mental simulations based on static images²³. Therefore, the animation is very necessary for the learning process. This can be seen from the statements of students who stated the need for animation in guided inquiry learning model which was in a very high category.

V. Conclusion and Suggestion

Based on the results and discussion of the preliminary study, it can be concluded that the guided inquiry learning model was implemented in schools during the learning process even though not all of the existing syntax was not implemented properly, especially in the following variables, namely the formulation of problems, make hypotheses and prove hypotheses. The use of animation in the learning process was not used properly, which can be seen in the results of the questionnaire on the use of animation during the learning process which was in very low category. Therefore further development is needed related to the importance of animation in the learning process.

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